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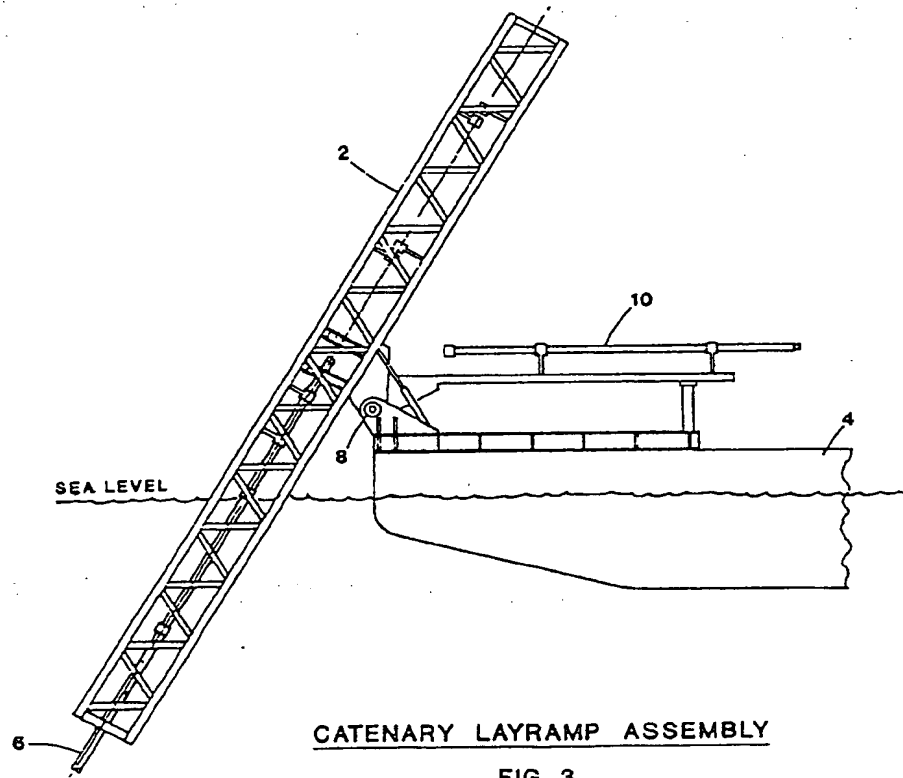
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(54) **Subsea pipe-lay**

(57) A pipe-laying vessel and method in which the pipe (6) is deployed from the vessel (4) via a supporting framework (2) which is mounted on the vessel at an angle to the horizontal adjusted to reduce or minimize the stress in the dependent pipe between vessel and seabed and to maintain this dependent pipe in catenary conformation.



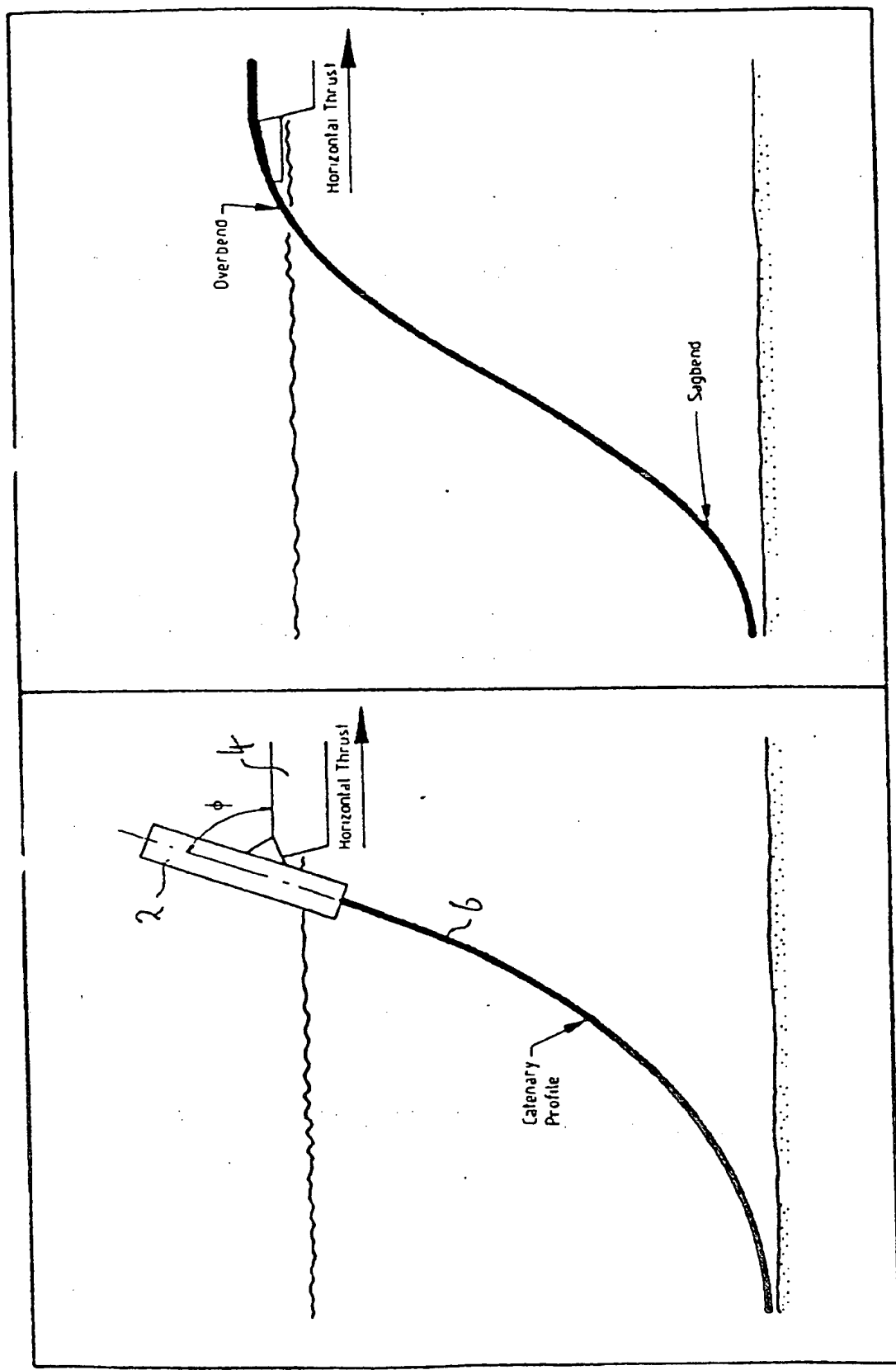
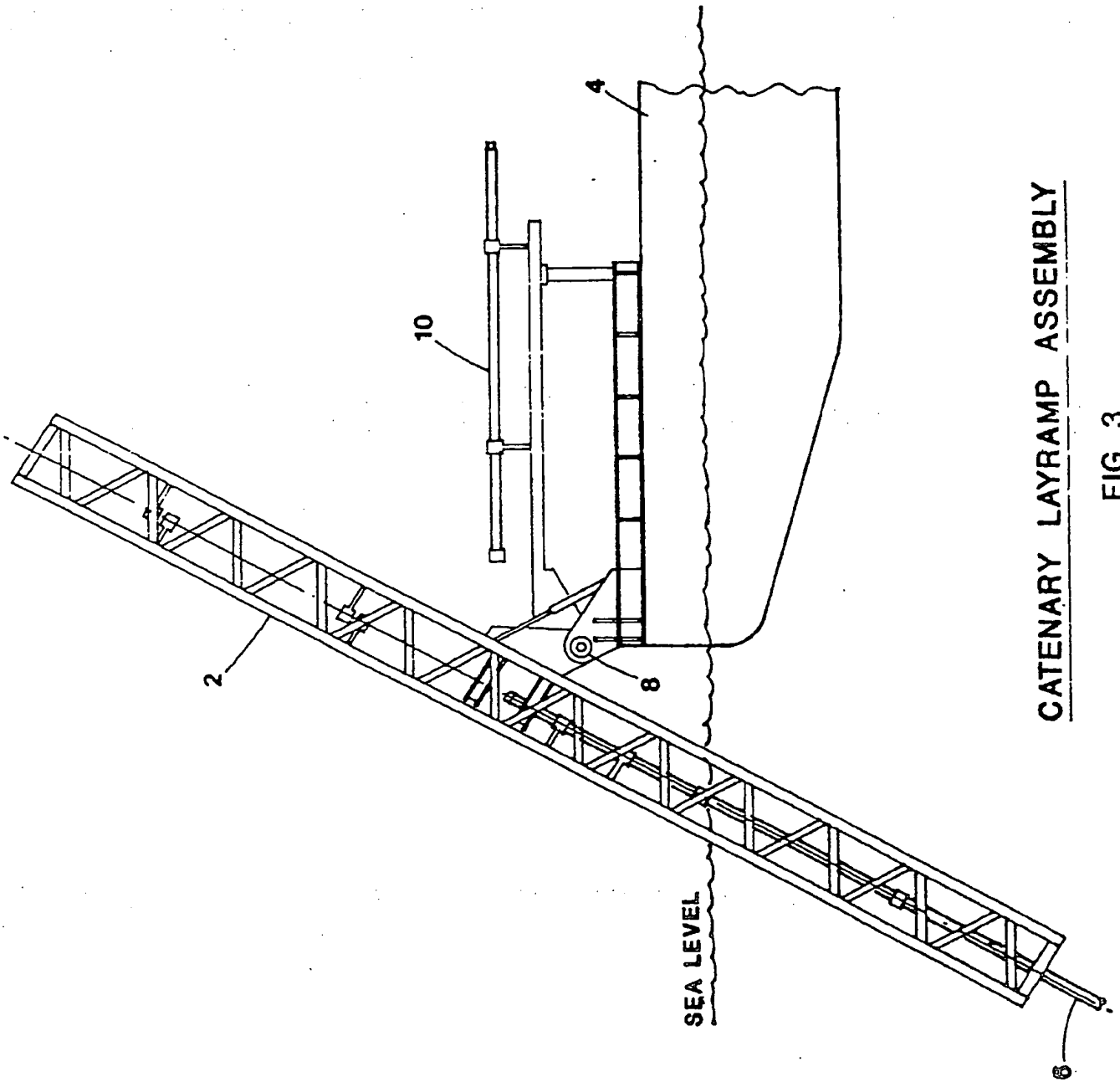


FIG. 2

FIG. 1

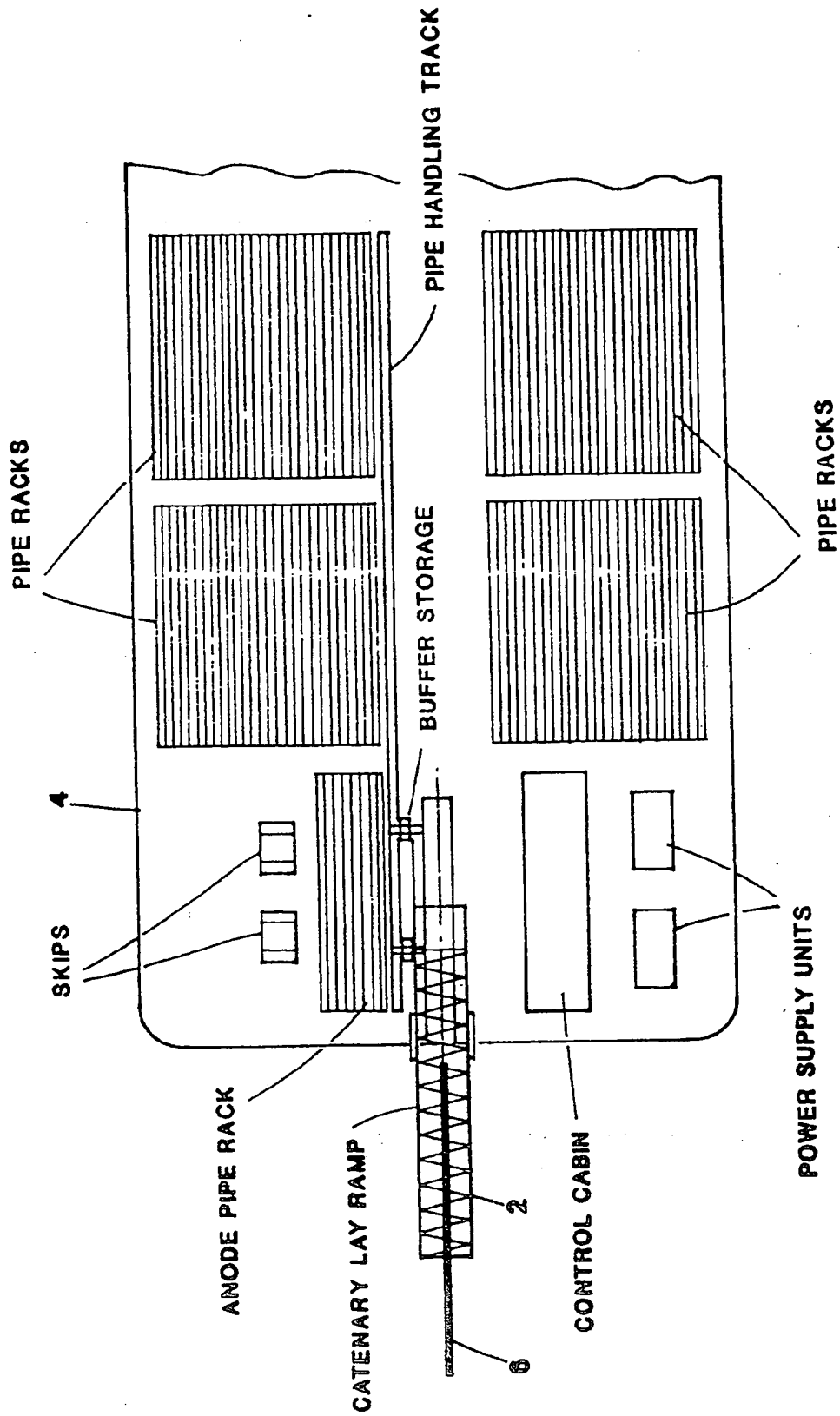
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CATENARY LAYRAMP ASSEMBLY

FIG. 3

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DECK LAYOUT

FIG. 4

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SURSEA PIPE-LAY

The present invention relates to the laying of pipes on the seabed from a surface vessel and provides a pipe-laying vessel and method in which the pipe is deployed from the vessel via a supporting framework which is mounted on the vessel at an angle to the horizontal adjusted to reduce or minimise the stress in the dependant pipe between vessel and seabed and to maintain this dependant pipe in catenary conformation.

The inclination of the supporting framework is adjusted towards optimum according to factors such as the thrust created by the vessel, the water depth, and the pipe weight, etc; the inclination can be preset, or the relevant factors could be monitored during operation and the inclination adjusted accordingly at intervals or continuously; another possibility is to sense the stress in the dependant pipe at intervals or continuously, with adjustment of the framework inclination to maintain this stress at or near a minimum.

By means of the invention it is possible to avoid the undue stress, with overbend near the surface and sag bend near the seabed, commonly encountered with some conventional pipe-laying techniques.

The structural framework by which the pipe is deployed is suitably positioned at the stern of the vessel, the catenary profile of the dependant pipe being maintained by appropriate orientation of the framework for the given thrust created by the vessel [by means of propulsion or anchors], the given water depth, and the given characteristics [weight, flexibility etc.] of the pipe.

The invention is illustrated, by way of example only, in the accompanying schematic drawings, in which :-

FIGURE 1 illustrates the catenary profile of pipe being laid according to the invention;

FIGURE 2 illustrates the undue stress in pipe being laid by a conventional procedure not according to the invention;

FIGURE 3 is a schematic side elevation of the rear end of a pipe-laying vessel according to the invention showing the inclined pipe-laying framework; and

FIGURE 4 is a schematic plan view of the rear of the Fig.3 vessel.

Figure 1 shows pipe under minimum stress extending in a catenary to the seabed from the inclined pipe-laying framework 2 [or catenary lay ramp] mounted at the stern of vessel 4 according to the invention, the vessel applying horizontal thrust as indicated. Figure 2 illustrates in contrast the overbend and consequent undue stress encountered when the pipe is deployed in one conventional manner from the rear of a vessel.

Figure 3 shows in a little more detail, but still schematically, the inclined catenary lay ramp 2 adjustably pivoted as at 8 at the stern of vessel 4 laying pipe 6 [as in Fig.1] to which additional sections 10 will be added as laying proceeds. Figure 4 shows schematically more of the deck layout of the Fig.3 vessel.

The pipe-laying procedure and vessel according to the invention preferably operate with the pipeline acting as an anchor.

C L A I M S :

1. A pipe-laying surface vessel and method in which the pipe is deployed from the vessel via a supporting framework which is mounted on the vessel at an angle to the horizontal adjusted to reduce or minimize the stress in the dependant pipe between vessel and seabed and to maintain this dependant pipe in catenary conformation.
2. A vessel and method according to claim 1 substantially as hereinbefore described.